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**Organization and Operation of  
ILLINOIS GRAIN PROCESSORS,  
TERMINAL ELEVATORS, and  
SUBTERMINAL ELEVATORS**

By D. A. STOREY

Bulletin 692

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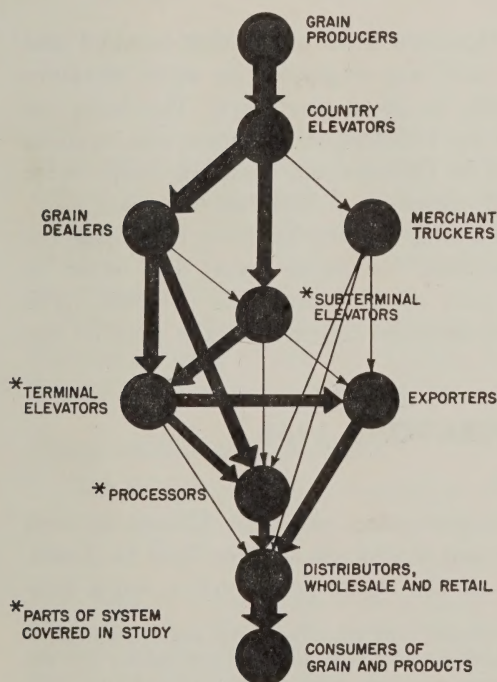
*Special acknowledgment is expressed to Mrs. Theda Ballantyne, Research Assistant, Iowa State University, who collected some of the data used in this report.*

# Organization and Operation of Illinois Grain Processors, Terminal Elevators, and Subterminal Elevators

D. A. STOREY, Assistant Professor of Agricultural Marketing

**T**HE ILLINOIS GRAIN MARKETING SYSTEM is comprised of many different types of firms that handle, store, and process grain as it moves from producer to ultimate consumer. This bulletin deals with the 1960 operations of major grain processors, terminal elevators, and subterminal elevators in Illinois. Their place in the total grain marketing system is shown schematically in Fig. 1.

This study includes information on the number and types of plants, processing volumes and capacities, merchandising volumes, storage capacities, and channels for acquisition and disposition of grain and products. Some information on firm organization is also included.



Principal channels of Illinois grain marketing system. An asterisk indicates parts of system covered in this study. (Fig. 1)



Data contained in this report were gathered for use in a north-central regional grain-marketing study (NCM-30) of grain-marketing institutions and the structure of grain markets. The forthcoming summary of regional data should be particularly useful, because different parts of the regional grain-marketing system are interrelated. This report is presented as a service to those who may be especially interested in the Illinois system.

## **SOURCE AND COVERAGE OF DATA**

Data were obtained by personal visits to Illinois grain-marketing firms during 1961 and 1962. Seventy-one firms with a total of 123 plants were visited. Firms meeting the following definitions were included.

Processors and manufacturers were plants that manufactured processed products primarily from bulk grain and oilseed products and that sold products primarily to wholesalers, retailers, and other dealers. To be included, plants had to have at least a 50-ton daily processing capacity (or 500 sacks for flour millers), or a 100,000-bushel bulk grain storage capacity.

Terminal and subterminal elevators were plants that handled and stored grain of which at least half was originated by other elevators and handlers rather than directly by farm producers. The basis for distinguishing between terminal and subterminal elevators was location. In this study, elevators located in Chicago and East St. Louis were called terminal elevators and all others were called subterminals.

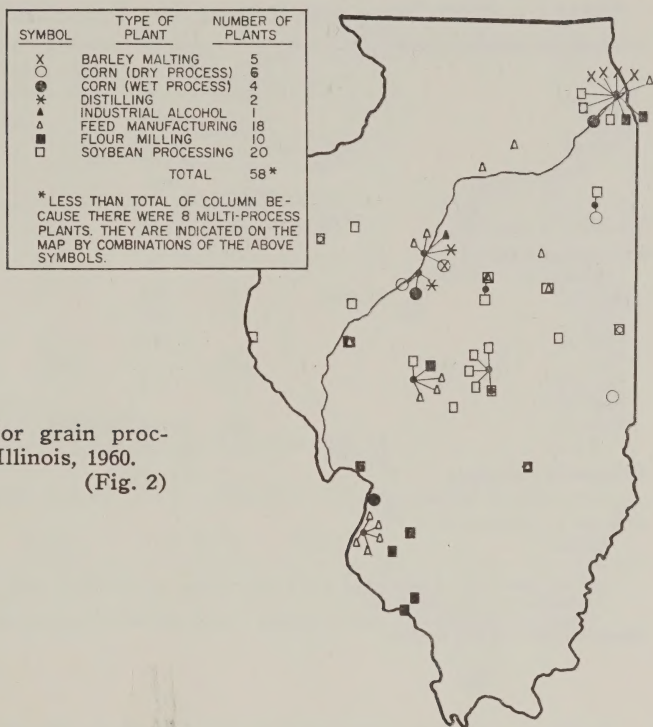
Data were collected on processing or merchandising activities for the calendar year 1960, if possible. In some cases, data refer to accounting years that include part of 1959 and part of 1960. The physical facilities described are those in existence at the time of the interviews in 1961.

## **PLANT OPERATIONS, 1960**

### **Processing operations**

There were 58 major grain processing plants in Illinois in 1960 (Fig. 2).<sup>1</sup> Plants were concentrated in Chicago, Peoria, East St. Louis, and east-central Illinois. Most of the plants performed a single type

<sup>1</sup> Nearly all Illinois processors except feed manufacturers were classified as major and included in this study. Many country feed mills did not qualify for the study because their processing volumes were too small. Also, some larger feed manufacturers did not qualify, because they distributed most of their products directly to final consumers rather than to dealers.



Location of major grain processing plants in Illinois, 1960.  
(Fig. 2)

of processing operation. Eight of the plants, however, performed two operations and are called multi-process plants in some parts of this study. About 300 million bushels of grain were processed in Illinois in 1960 (Table 1).<sup>1</sup> Corn and soybean processing were the two most important industries.

Overall, Illinois plants operated at about 84 percent of estimated capacity in 1960 (Table 1).<sup>2</sup> Utilization of processing capacity ranged from 82 percent for corn processors to 92 percent for flour millers.

### Merchandising operations

The 65 subterminal and terminal elevators in Illinois in 1960 were concentrated in the same areas (Fig. 3) as the processing plants—Chicago, Peoria, East St. Louis, and east-central Illinois—with an

<sup>1</sup>There is no way to check the accuracy of these estimates. Soybean processing is the only industry for which individual state volumes are published. *The Soybean Digest* (March 1960-February 1961) indicates that the 1960 processing volume was 119,653,000 bushels.

<sup>2</sup>Processing capacities were measured by the methods commonly used in each industry; for example, in the soybean processing industry, 24 hours a day and 7 days a week.

Table 1. — Grain Processing Volumes and Capacities in Illinois, 1960

	Type of processing operation					Total
	Barley malting	Corn process- ing	Feed manu- factur- ing	Flour milling	Soybean process- ing	
Number of plants.....	5	13	18	10	20	58 <sup>a</sup>
Processing volume, thousands of bushels						
Barley.....	15,080	126	384			15,590
Corn.....		111,300	7,509			118,809
Oats.....			1,349			1,349
Rye.....		750		300		1,050
Sorghum.....		747	353			1,100
Soybean.....					120,911	120,911
Wheat.....		300	44	40,428		40,772
Total.....	15,080	113,223	9,639	40,728	120,911	299,581
Processing capacity, thousands of bushels	18,000	139,000	(b)	44,334	144,833	346,167 <sup>c</sup>
Volume as percent of capacity.....	83.8	81.5	(b)	91.9	83.5	83.8 <sup>c</sup>

<sup>a</sup> Less than total of individual operations, because there were 8 multi-process plants.

<sup>b</sup> Insufficient data available.

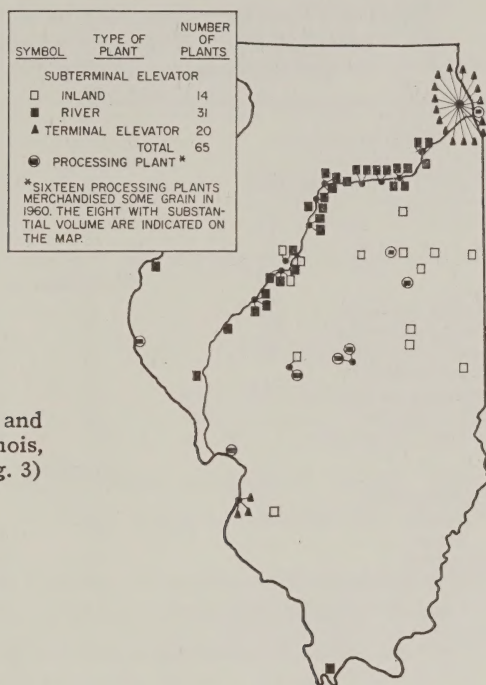
<sup>c</sup> Does not include feed manufacturing. Total volume as percent of capacity is based on volume of 289,942,000 bushels.

Table 2. — Volume of Grain Merchandised in Illinois by Terminal and Subterminal Elevators and Processors, 1960

	Type of elevator operation					Total
	Subterminal elevators				Terminal elevators	
	Inland	Pro- cessor	River	Sub- total		
Number of plants....	7 <sup>a</sup>	16	31	54	17 <sup>a</sup>	71
Merchandising vol- ume, thousands of bushels						
Barley.....			16	16	1,539	1,555
Corn.....	14,730	16,531	77,403	108,664	84,237	192,901
Oats.....	300	1,109	6,769	8,178	14,123	22,301
Rye.....			2	2	1,904	1,906
Sorghum.....			90	90	312	402
Soybeans.....	908	8,495	21,843	31,246	33,981	65,227
Wheat.....	301	8,193	8,184	16,678	30,553	47,231
Total.....	16,239	34,328	114,307	164,874	166,649	331,523

<sup>a</sup> Less than indicated in Figure 3, because some elevators conducted only storage operations in 1960.





Location of major terminal and subterminal elevators in Illinois, 1960. (Fig. 3)

additional concentration of river subterminals along the Illinois River. Fifty-five of the elevators merchandised grain in 1960.<sup>1</sup> In addition, merchandising operations were conducted at 16 processing plants.<sup>2</sup>

About 332 million bushels of grain were merchandised by Illinois subterminal and terminal elevators and processors (Table 2).<sup>3</sup> Corn accounted for about 58 percent of the total, soybeans for 20, and wheat for 14 percent. The net figure for grain merchandised was about 281 million bushels, because some grain that moved from subterminal to terminal elevators was actually counted twice in Table 2.

<sup>1</sup> Seven subterminal and 3 terminal elevators conducted only storage operations in 1960. Several other elevators had primarily storage operations.

<sup>2</sup> Of these, 8 had subterminal type merchandising operations of more than 500,000 bushels each. The other 8 merchandised small amounts, chiefly overflows from the processing operations.

<sup>3</sup> There is no way to check the subterminal elevator merchandising volumes. Terminal elevator volumes may be compared to total Chicago and St. Louis (including East St. Louis) receipts of 291 million bushels in 1960. (Source: Annual Reports, Board of Trade of the City of Chicago, and Merchants' Exchange of St. Louis.) This checks reasonably with the 167-million-bushel terminal elevator merchandising volume reported here, because the terminal market receipts include grain received by processors, grain received for storage, grain merchandised by dealers who did not have physical facilities, and grain handled in terminal elevators in St. Louis, Missouri.

**Table 3.—Storage Capacities in Relation to Processing and Merchandising Volumes; Illinois Grain Processors and Subterminal and Terminal Elevators, 1960**

Type of operation	Number of plants	Storage capacity (thousand bushels)	Bushels processed per bushel storage capacity	Bushels merchandised per bushel storage capacity
<b>Processors</b>				
Barley malting.....	4	8,400	1.7	
Corn processing.....	9	4,492	18.3	
Feed manufacturing.....	14	4,775	1.7	
Flour milling.....	8	12,355	2.9	
Soybean processing.....	15	24,475	3.3	
Multi-process <sup>a</sup> .....	8	26,839	2.9	
Total, processors.....	58	81,336	3.7	
<b>Elevators</b>				
Subterminal				
Inland.....	14	22,950		.7
River.....	31	10,094		11.3
Terminal.....	20	68,657		2.4
Total, elevators.....	65	101,701		2.9
Total, elevators and processors...	123	183,037		

<sup>a</sup> Plants with more than one type of processing operation.

## PLANT FACILITIES

### Storage facilities

Total storage capacity of Illinois grain processors, terminal elevators, and subterminal elevators was about 183 million bushels (Table 3).<sup>1</sup> The average processing plant processed 3.7 bushels for every bushel of storage capacity. The ratio ranged from 1.7 for barley malsters to 18.3 for corn processors.<sup>2</sup> Terminal and subterminal elevators merchandised 2.9 bushels for every bushel of storage capacity, with the range from 0.7 for inland subterminals to 11.3 for river subterminals.<sup>3</sup>

Only 14 of the 58 processing plants regularly stored grain for the accounts of others. All terminal and inland subterminal elevators and

<sup>1</sup> Total storage (Table 3) is not comparable to the off-farm storage reported by the U. S. Dept. of Agr. Stat. Rprt. Serv., because it does not include country elevators, ships, and some warehouses. Illinois off-farm storage for January 1, 1961, as reported by the U. S. Dept. of Agr., was 377.7 million bushels.

<sup>2</sup> Since corn moves to market at fairly steady rates throughout the year, corn processors do not keep large stocks on hand. This is particularly true for wet corn processors and distillers.

<sup>3</sup> The ratios would be even higher if strictly storage (no merchandising) elevators were not included.



Table 4.—Grain Receiving and Loading Facilities; Illinois Grain Processors and Terminal and Subterminal Elevators, 1960

Type of operation	Total	Number of plants					
		Receiving facilities			Loading facilities		
		Rail	Truck	Water	Rail	Truck	Water
Processors.....	58	54	47	5	57	51	5
Subterminal elevators							
Inland.....	14	14	11		14	7	
River.....	31	9	31	2	14	12	31
Terminal elevators...	20	20	10	11	20	9	13
Total elevators....	65	43	52	13	48	28	44
Total, processors and elevators....	123	97	99	18	105	79	49

5 river subterminals stored grain for the accounts of others. Other accounts included processors, country shippers, speculators, jobbers, and the CCC.

Three terminal and 7 subterminal elevators with a total storage capacity of about 13.3 million bushels used all their space for storage of CCC corn. They did not store grain for their own or other firms' accounts, and they did not merchandise grain. Storage was a more important part of the business than merchandising in 5 other terminals and 3 other subterminals with a total storage capacity of about 13.7 million bushels. Thus, about 27 percent of elevator storage was in plants that specialized in storage rather than merchandising.

Firms were asked what percentage of their storage space they could tie up for 90 days or more. On the average, processors could use 71 percent of their space for long-term storage and elevators could use 79 percent. Percentages for individual industries were: barley malting, 76.2; corn processing, 5.2; feed manufacturing, 66.4; flour milling, 70.8; soybean processing, 61.3; multi-process plants, 88.6; inland subterminals, 93.8; river subterminals, 57.4; and terminals, 77.7.<sup>1</sup>

### Receiving and loading facilities

The types of receiving and loading facilities available are shown in Table 4. Rail facilities were present in nearly all plants except

<sup>1</sup> Averages are misleading for feed manufacturers and river subterminals. In both cases, most plants had no space available for long-term storage, but a few large plants raised the averages for the groups.

river subterminals. Truck facilities were available in most plants, but were not available in some subterminals and terminals used primarily for storage. Water facilities were present mainly in river subterminals and in some of the terminals.

## FLOW CHANNELS FOR GRAIN AND PRODUCTS

### Channels for acquisition and disposition

The aggregate channels for the flow of grain to and from Illinois subterminal and terminal elevators and processors are indicated in Fig. 4.<sup>1</sup> Country elevators accounted for 96 percent of the grain moving into the system.<sup>2</sup> Of the aggregate volume handled, 66 percent was processed (about seven-eighths of this by Illinois processors), 26 percent went to export elevators, and 5 percent to terminal elevators outside Illinois.

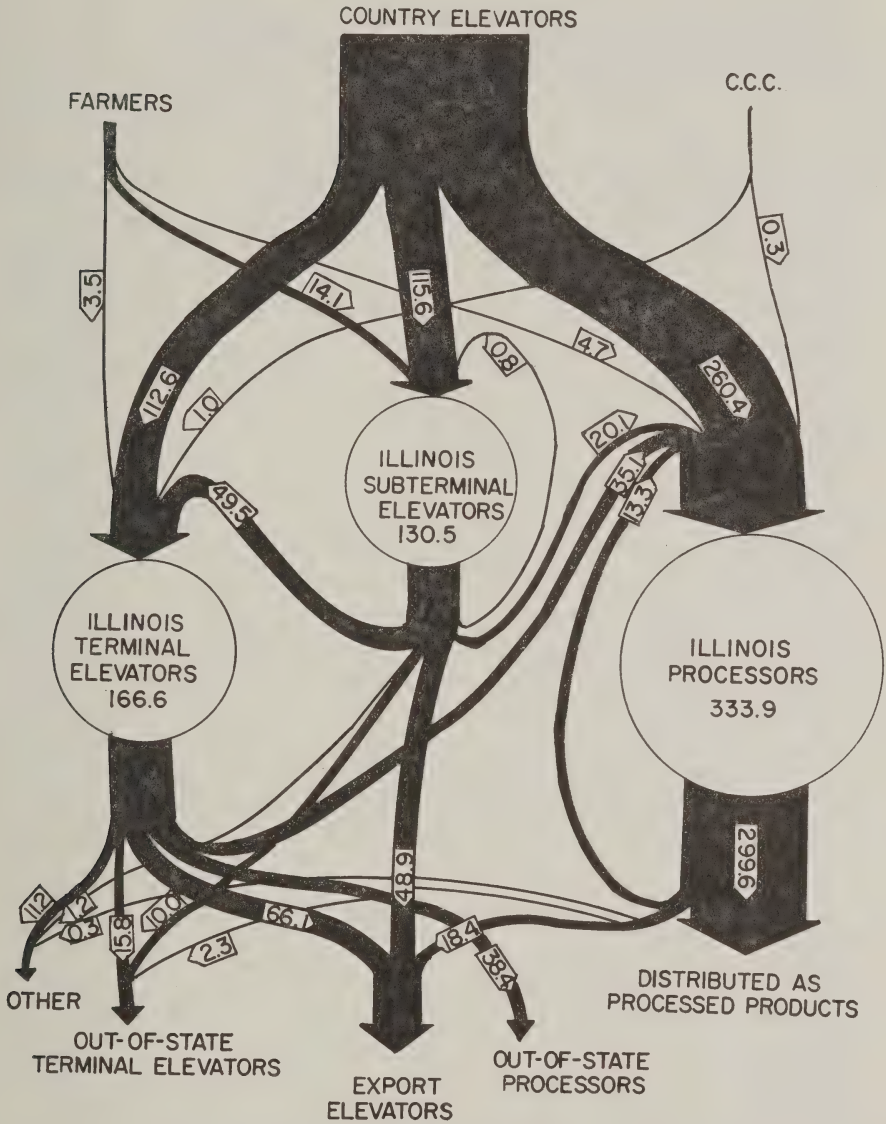
Channels vary among different types of operations, depending on functions performed. Subterminal elevators serve mainly as links between country elevators and terminal elevators. In 1960, subterminals received 89 percent of their grain from country elevators (Table 5) and shipped 84 percent to terminal and export elevators (Table 6). Most river subterminals receive grain by truck and transfer it to barges. Inland subterminals receive grain by truck or rail, but usually ship by rail.

Terminal elevators are more diverse in their functions and utilize various channels for grain receipts and shipments. In 1960, 68 percent of their grain came from country elevators and 30 percent from subterminal elevators (Table 5). Terminal elevators shipped 40 percent of their grain to export elevators, 44 percent to processors, and 10 percent to other terminal elevators (Table 6). Terminal elevators receive grain by rail, truck, or barge, and ship mainly by rail, barge, and lake or ocean vessel.

Processors received 78 percent of their grain from country elevators and 21 percent from subterminal and terminal elevators (Table

<sup>1</sup> Fig. 4 was derived by applying the total grain percentages for various channels (Tables 5 and 6) to the total processing and merchandising volumes (Tables 1 and 2). Note that Fig. 4 and Tables 5 and 6 account for only the immediate sources and destinations of subterminal, terminal, and processor grain; they do not necessarily indicate original sources or ultimate destinations.

<sup>2</sup> Most grain received from country elevators by terminal elevators and processors passed through carlot dealers or other merchandisers. A few of the smaller processing plants and most of the subterminal elevators received the bulk of their grain direct from country elevators.



Immediate channels of acquisition and disposition of grain by Illinois grain processors, terminal, and subterminal elevators, 1960. Million bushels. Most of the grain received by processors and terminal elevators from country elevators passed through carlot dealers or other merchandisers. (Fig. 4)



**Table 5.—Channels for Acquisition of Grain by Illinois Terminal and Subterminal Elevators and Processors, 1960<sup>a</sup>**

Type of plant receiving grain and type of grain	Percentage acquired from each type of agency				
	Farmers	Country elevators <sup>b</sup>	Terminal and sub-terminal elevators	CCC	Total
Feed grains <sup>c</sup>					
Processor.....	.5	79.4	20.0	.1	100.0
Subterminal.....	8.4	90.9	.7		100.0
Terminal.....	1.7	66.6	30.7	1.0	100.0
Soybeans					
Processor.....	1.4	90.7	7.8	.1	100.0
Subterminal.....	19.4	80.6			100.0
Terminal.....	2.2	71.3	26.4	.1	100.0
Wheat					
Processor.....	4.3	39.7	56.0		100.0
Subterminal.....	13.4	86.6			100.0
Terminal.....	3.3	66.7	30.0		100.0
Total grain					
Processor.....	1.4	78.0	20.5	.1	100.0
Subterminal.....	10.8	88.6	.6		100.0
Terminal.....	2.1	67.6	29.7	.6	100.0

<sup>a</sup> Based on questionnaires answered by 57 of 58 processing plants, 36 of 38 subterminal elevators, and 16 of 17 terminal elevators.

<sup>b</sup> Includes grain received directly from country elevators and grain received from truckers, carlot dealers, and other merchandisers of country elevator grain.

<sup>c</sup> Corn, oats, barley, rye and sorghum.

**Table 6.—Channels for Disposition of Grain Merchandised by Illinois Terminal and Subterminal Elevators and Processors, 1960<sup>a</sup>**

Type of plant selling grain and type of grain	Percentage of grain sold to each type of agency				
	Terminal elevators	Export elevators	Processors	Other <sup>b</sup>	Total
Feed grains <sup>c</sup>					
Processor <sup>d</sup> .....	10.8	48.3	38.8	2.1	100.0
Subterminal.....	45.4	36.2	17.2	1.2	100.0
Terminal.....	12.4	36.2	45.1	6.3	100.0
Soybeans					
Processor <sup>d</sup> .....	5.9	78.0	16.1		100.0
Subterminal.....	50.5	40.9	8.6		100.0
Terminal.....	3.1	43.5	46.6	6.8	100.0
Wheat					
Processor <sup>d</sup> .....	1.1	35.3	63.6		100.0
Subterminal.....	43.8	42.7	13.2	.3	100.0
Terminal.....	7.5	46.2	38.8	7.5	100.0
Total grain					
Processor <sup>d</sup> .....	6.8	53.5	38.7	1.0	100.0
Subterminal.....	46.2	37.5	15.4	.9	100.0
Terminal.....	9.5	39.7	44.1	6.7	100.0

<sup>a</sup> Based on questionnaires answered by 15 of 16 processors, 37 of 38 subterminal elevators, and 15 of 17 terminal elevators.

<sup>b</sup> Includes delivery on futures and sales to truckers and local feeders.

<sup>c</sup> Includes corn, oats, barley, rye, and sorghum.

<sup>d</sup> Grain merchandised by processors. Does not include grain that was processed.

5). Country elevators as sources were relatively most important for soybeans and least important for wheat. The 10 percent of processor grain that was merchandised passed through channels similar to those used by subterminal and terminal elevators (Table 6).

### Channels for disposition of processed products

Processors were also asked about the disposition of their processed products. The wide variety of products and uses caused numerous incomplete answers to the question.

**Barley malting.** Answers from the 5 plants indicated about 88 percent of the malt went to breweries and the remaining 12 percent to distillers and various food manufacturers. The sprouts, a by-product of the malting process, were used chiefly by feed manufacturers, although some were handled by brokers rather than sold directly to manufacturers.

**Corn processing.** The multiplicity of products from corn processes made answers to the question particularly difficult. The starch, sugar, syrup, oil, and other products of the wet process moved to various food and industrial uses. Dry process products include meal, flour, grits, and oil. They were used in cereal and various food uses, dog food, brewing, industrial uses, and feed. Alcohol produced in distilling and industrial alcohol plants generally moved directly to distributors or consumers. Byproducts from the various processes were used chiefly by feed manufacturers.

**Feed manufacturing.** About 82 percent of the feed produced (in 17 plants answering this question) went to dealers, while the remainder went directly to farmers or consumers.<sup>1</sup>

**Flour milling.** In the 8 flour mills answering this question, 80 percent of the flour went to bakers, 13 was sold to retailers or wholesalers, and the remaining 7 percent went to jobbers, was exported, or was used in cake mixes.<sup>2</sup> Of the byproducts (bran and shorts), 80 percent was sold to feed manufacturers, 10 percent to jobbers, 7 to farmers, and 3 percent to feed dealers.

**Soybean processing.** Of the meal produced in the 16 plants that answered this question, 95 percent went to feed manufacturers. The rest was sold directly to farmers or feed dealers, or went to export elevators. One plant used the meal for dog food. Nearly all the oil went to refineries, although a small amount was exported.

<sup>1</sup> Feed manufacturers who distributed over half of their feed directly to final consumers were not included in the survey.

<sup>2</sup> The two largest flour mills did not answer this question.

## Geographic distribution of processed products

Most products were distributed more than 100 miles from the plants (Table 7). Many Illinois processors distributed their products nationwide. The feed plants were most local in character, as they distributed over half their products less than 100 miles from their plants. Generally, byproducts were shipped shorter distances than major products because many went to Illinois feed manufacturers.

**Table 7.—Distances That Processed Products Were Distributed From Illinois Grain Processing Plants, 1960<sup>a</sup>**

Type of operation and product	Percentage of total processed products				Total
	0-25 miles	25-50 miles	50-100 miles	Over 100 miles	
Barley malting					
Barley malt.....	5.5		1.4	93.1	100.0
Byproducts.....	27.7			72.3	100.0
Corn processing					
Major products.....	6.0	2.6	9.2	82.2	100.0
Byproducts.....	17.8	3.0	4.3	74.9	100.0
Feed manufacturing					
Feed.....	11.2	16.5	30.8	41.5	100.0
Flour milling					
Flour.....	12.8	7.3	13.0	66.9	100.0
Byproducts.....	2.7	10.6	15.0	71.7	100.0
Soybean processing					
Meal.....	8.6	7.1	17.4	66.9	100.0
Oil.....	16.4	5.7	16.8	61.1	100.0

<sup>a</sup> Based on answers to questionnaires by 5 barley maltsters, 12 corn processors, 17 feed manufacturers, 10 flour millers, and 17 soybean processors. Plant outputs were weighted by bushels of grain input used.

## ORGANIZATION OF THE FIRMS

### Number and type

In 1960, 48 firms operated processing plants and 34 operated elevators (Table 8). Of the processing firms, 11 also operated elevators either at the plant or in separate operations, so there were 71 firms in all.<sup>1</sup>

Over 90 percent of the 71 firms were organized as corporations (Table 8). About half the processing corporations and about three-quarters of the elevator corporations were of the closed type.

<sup>1</sup> Eight other processing firms merchandised small quantities of grain.



Table 8.—Numbers and Types of Firms; Illinois Grain Processors and Terminal and Subterminal Elevators, 1960

Type of operation	Number of plants	Number of firms				
		Total	Corporations		Cooper- atives	Partner- ships or proprie- torships
			Open	Closed		
Processors						
Barley malting.....	5	5	3	2		
Corn processing						
Distilling.....	2	2	2			
Dry process.....	6	6	3	3		
Industrial alcohol.....	1	1	1			
Wet process.....	4	3	2	1		
Feed manufacturing.....	18	15	7	7	1	
Flour milling.....	10	10	4	6		
Soybean processing.....	20	18	8	8		2
Total, processors.....	58 <sup>a</sup>	48 <sup>b</sup>	22 <sup>c</sup>	23 <sup>c</sup>	1	2
Elevators						
Subterminal						
Inland.....	14	11	1	10		
Processor.....	8	8	6	1		1
River.....	31	11	3	6	2	
Terminal.....	20	13	1	10	1	1
Total, elevators.....	73	34 <sup>d</sup>	9 <sup>e</sup>	21 <sup>e</sup>	2 <sup>e</sup>	2
Total, processors and elevators.....	123 <sup>e</sup>	71 <sup>f</sup>	23 <sup>e</sup>	42 <sup>e</sup>	3	3 <sup>e</sup>

<sup>a</sup> Less than total of column because there were 8 multi-process plants.<sup>b</sup> Less than total of column because there were 12 multi-process firms.<sup>c</sup> Less than total of column because of firms listed for more than one type of activity as explained in various footnotes.<sup>d</sup> Less than total of column because 5 firms had 2 types of elevators and 2 firms had 3 types of elevators.<sup>e</sup> Less than total of processors and elevators because 8 processing plants were counted in both.<sup>f</sup> Less than total of processors and elevators because 11 firms were counted in both.

## Type and extent of integration

The term integration refers to the ownership or control under one management of two or more plants. If the plants perform similar functions, integration is called horizontal. If the plants perform different functions at successive stages in the marketing process, integration is called vertical. Both horizontal and vertical integration may have the undesirable effect of decreasing competition, either within one industry or between industries. On the other hand, they may lead to lower cost operation and more technological progress.

A discussion of integration is complicated by several factors. First, measures of integration for Illinois alone are not as meaningful as measures on a national basis. Some firms have plants both within and outside Illinois. Second, the extent of integration is best measured



Table 9.—Acquisition and Disposition of Grain and Products from Company-Owned Plants and Outside Firms; Illinois Grain Processors and Terminal Elevators, 1960

Type of activity	Acquisition of grain		Disposition of grain		Disposition of products <sup>a</sup>	
	Company-owned plants	Out-side firms	Company-owned plants	Out-side firms	Company-owned plants	Out-side firms
percent						
<b>Processors</b>						
Barley malting.....		100			2	98
Corn processing.....	5	95		100	15	85
Feed manufacturing.....	1	99		100	13	87
Flour milling.....	5	95	1	99	33	67
Soybean processing.....	13	87		100	15	85
Multi-process.....	4	96	10	90	10	90
Total, processors.....	6	94	4	96	14	86
<b>Elevators</b>						
Subterminal						
Inland.....	3	97		100		
River.....	( <sup>b</sup> )	100	60	40		
Terminal.....	20	80	20	80		
Total, elevators.....	11	89	33	67		
Total, processors and elevators.....	9	91	31	69		

<sup>a</sup> Weighted according to bushels of grain input used.

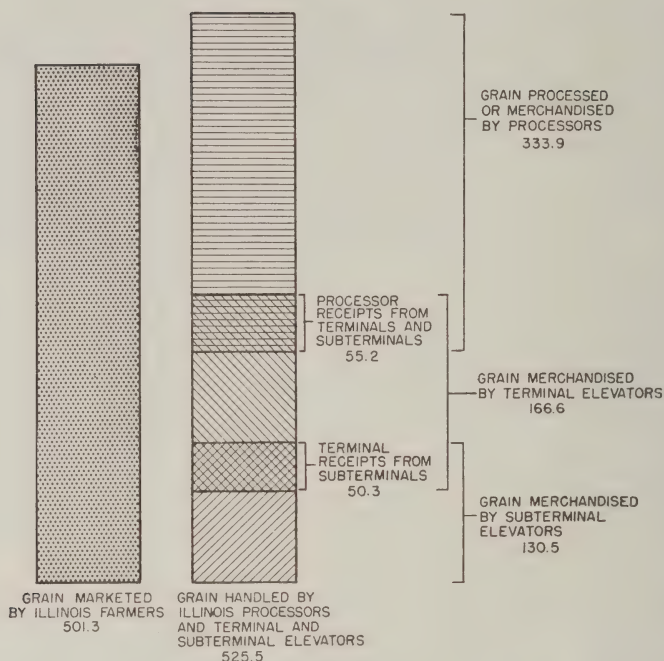
<sup>b</sup> Less than 0.5 percent.

curred in 12 firms, with a total of 20 processing plants, 8 of them multi-process plants.<sup>1</sup>

Another indication of the extent of vertical integration is given by the relative percentages of grain acquired from and disposed of through company-owned and outside firms (Table 9). Terminal elevators and soybean processors were the only two types of plants that acquired more than 10 percent of their grain from company-owned sources. River subterminals disposed of over three-quarters of their grain through company-owned terminal elevators, and terminal elevators sent 21 percent of their grain to company-owned

<sup>1</sup> Integration of different processing operations may be considered horizontal, vertical, or conglomerate (unrelated). Most of these approximated the definition of vertical integration. Soybean processing and feed manufacturing were combined in 5 firms and flour milling and feed manufacturing were combined in 2 firms. In these cases, part of the product of one process, soybean meal or bran and shorts, was used as an input in another process, feed manufacturing. Two firms combined dry process corn processing and barley malting with products used in a third process, brewing or malt syrup manufacture. One firm combined dry process corn and soybean processing and used the products in dog food. Only two processing combinations—one dry process corn and soybean processing and one wet process corn and soybean processing—did not appear to fit the definition of vertical integration.





Estimated volume of grain marketed by Illinois farmers compared with estimated volume handled by Illinois processors, terminal, and subterminal elevators, 1960. Million bushels. (Fig. 6)

processing plants and export elevators. The highest degree of integration in the disposition of processed products occurred in flour milling, where 33 percent of the flour was sent to company-owned plants. Other processing industries sent from 85 to 98 percent of their products to outside firms.

## ILLINOIS TERMINAL ELEVATORS AND PROCESSORS IN PERSPECTIVE

### Relation to volume of grain marketed by Illinois farmers

Illinois subterminal and terminal elevators and processors handled more grain in 1960 than was marketed by Illinois farmers (Fig. 6).<sup>1</sup>

<sup>1</sup> Grain marketed by Illinois farmers estimated from percentage of Illinois production sold off-farms (source: U. S. Dept. Agr., Agr. Stat., 1960) and percentage of sales by months (source: Ill. Agr. Stat., Ann. Summary, 1961; Ill. Coop. Crop Rpt. Serv.). Does not include estimated sales to CCC.

This comparison may be misleading, however, because not all the grain that is sold by Illinois farmers passes through this part of the grain marketing system. After allowing for interfarm sales, sales by farmers to truckers, sales to farmers by country elevators, and out-of-state rail and truck shipments by country elevators and merchandisers, probably no more than 350 million bushels of Illinois-produced grain passed through this part of the Illinois grain-marketing system in 1960.<sup>1</sup> The remaining 175 million bushels handled must have originated on out-of-state farms.

### Relation to United States grain marketing system

Illinois processors are very important in relation to the total United States grain-processing system (Table 10). In 1960, Illinois processors

Table 10.—Comparison of Illinois and U. S. Grain Processing Volumes, 1960

Type of operation	1960 U. S. processing volume	1960 Ill. processing volume	Ill. as percentage of U. S.
	thousand bushels		
Barley malting.....	91,500 <sup>a</sup>	15,080 <sup>b</sup>	16.5
Corn processing			
Distilling and industrial alcohol.....	31,000 <sup>a</sup>		
Dry process.....	100,500 <sup>a</sup>		
Wet process.....	153,471 <sup>c</sup>		
Total.....	284,971	111,300 <sup>b, d</sup>	39.1
Flour milling.....	483,500 <sup>e</sup>	40,428 <sup>b, e</sup>	8.4
Soybean processing.....	396,770 <sup>f</sup>	120,911 <sup>b</sup>	30.5

<sup>a</sup> Source: *The Feed Situation*, Nov. 1961. Estimated from 1959-60 and 1960-61 figures. U. S. Dept. Agr. Econ. Res. Serv.

<sup>b</sup> Source: Table 1.

<sup>c</sup> Source: 1960 supplement to grain and feed statistics. U. S. Dept. Agr. Econ. Res. Serv. Stat. Bul. 1959.

<sup>d</sup> Corn only.

<sup>e</sup> Wheat only.

<sup>f</sup> Source: *The Soybean Digest*. Mar. 1960-Feb. 1961.

accounted for about two-fifths of the corn processed in the United States (excluding corn used in feed) and three-tenths of the soybeans processed in the United States.<sup>2</sup> Substantial percentages of United States barley malt and wheat flour were also produced in Illinois.

<sup>1</sup> Estimate based mainly on statistics from D. A. Storey, *Truck Shipment of Grain in Illinois, 1954 to 1958-59*, AERR-39, Univ. Ill. Agr. Exp. Sta., and from R. C. Haldeman *et al.*, *Grain Transportation Statistics for the North-Central Region*, Stat. Bul. No. 268, Agr. Mrkt. Serv., U. S. Dept. Agr.

<sup>2</sup> Although the exact percentages can not be divulged, Illinois wet process and dry process corn processors accounted for in the neighborhood of one-half and one-third of their respective industries' outputs in 1960.

Illinois subterminal and terminal elevators handled roughly one-third of the grain merchandised by subterminal and terminal elevators in the North Central Region.<sup>1</sup> National subterminal and terminal elevator volumes are not known.

## 1960 compared with 1954

Data available from a 1954 study permit some comparison between 1954 and 1960. Estimated Illinois farm marketings in 1960 were 57 percent larger than in 1954 (501 million bushels compared with 319 million).<sup>2</sup> Corn and soybean marketings in particular were much larger.

Grain-processing volume was about 10 percent larger than in 1954 (Table 11).<sup>3</sup> Although there were 6 fewer plants in 1960, processing

Table 11.—Comparison of Illinois Grain Processors in 1954 and 1960<sup>a</sup>

Type of operation	Number of plants		Processing volume		Processing capacity		Storage capacity	
	1954	1960	1954	1960	1954	1960	1954	1960
			thousand bushels					
Barley malting.....	5	5	15,060	15,080	17,300	18,000	7,206	8,400
Corn processing								
Distilling and industrial alcohol	4	3	7,054		21,900		632	
Dry process.....	7	6	21,300		27,950		1,855	
Wet process.....	4	4	73,750		78,500		2,300	
Total.....	15	14	102,104	113,223	128,350	139,000	4,787	4,492
Feed manufacturing	17	18	13,349	9,639	27,136	(b)	4,089	4,775
Flour milling.....	9	10	33,425	40,728	39,260	44,334	11,340	12,355
Soybean processing..	22	20	105,965	120,911	117,820	144,833	46,319	24,475
Other.....	3		3,110		4,950		965	26,839 <sup>c</sup>
Total.....	64 <sup>d</sup>	58 <sup>e</sup>	273,013	299,581	307,680 <sup>b</sup>	346,167 <sup>b</sup>	74,706	81,336

<sup>a</sup> Source of 1954 data: Schumaier, C. P. Illinois grain production and trade. Ill. Agr. Exp. Sta. Bul. 637. Note: The two studies handled multi-process plants somewhat differently. For example, the bushels of corn and soybeans processed by a multi-process wet corn and soybean processing plant in 1954 were all listed under soybean processing if that was considered the major activity. In 1960, they were listed separately under the two activities. The composition of the category "other" in 1954 is not known.

<sup>b</sup> Feed manufacturing processing capacity not available for 1960 and not included in totals in both years.

<sup>c</sup> The storage capacity of the 8 multi-process plants.

<sup>d</sup> Less than total of column because there were 7 multi-process plants.

<sup>e</sup> Less than total of column because there were 8 multi-process plants.

capacity was about 13 percent larger than in 1954. One distillery, several soybean processors, and several feed manufacturers went out of business between 1954 and 1960.

<sup>1</sup> Based on preliminary tabulations from the NCM-30 regional grain marketing study.

<sup>2</sup> Estimates from same sources as those reported in Fig. 6.

<sup>3</sup> Industry breakdowns in the two studies were somewhat different, so a comparison of individual industries is not completely accurate.



Merchandising volume in 1960 was about 49 percent larger than in 1954 (Table 12), an increase very similar to the increase in farm marketings. In 1960, there were 2 more terminal and 13 more subterminal elevators. The new subterminals included inland subterminals built primarily to store CCC corn and new river subterminals along the Illinois River.

**Table 12. — Comparison of Illinois Subterminal and Terminal Elevators in 1954 and 1960<sup>a</sup>**

Type of operation	Number of plants		Merchandising volume		Storage capacity	
	1954	1960	1954	1960	1954	1960
			(thousand bushels)			
Subterminal elevator						
Inland.....		14		16,239		22,950
River.....		31		114,307		10,094
Total.....	32	45	89,403	130,546	6,421	33,044
Terminal elevator.....	18	20	116,700	166,649	48,600	68,657
Processor.....		16	17,090	34,328		
Total.....	50	65 <sup>b</sup>	223,193	331,523	55,021	101,701

<sup>a</sup> Source of 1954 data: same as Table 11.

<sup>b</sup> Not including processor merchandisers.

Total storage capacity in 1960 was 41 percent larger than in 1954 (183 million bushels compared with 129.7 million bushels). Fifty percent of the total increase was in subterminal elevator storage, 38 percent in terminal elevator storage, and 12 percent was in processor storage. The increased processor storage consisted chiefly of additions to existing facilities, while the increased terminal and subterminal storage consisted chiefly of new plants built since 1954.

## Changes in 1961 and 1962

Several important changes have occurred since 1960. In 1961, several new subterminal elevators and at least one new feed plant were built. Other plants added new storage facilities. In late 1961 and early 1962, two integrated elevator operations (3 terminal elevators and 10 subterminal elevators) and a soybean processing plant changed ownership.

## Possible future changes

Future changes in the part of the grain-marketing system described here depend on many factors. The total activity of the system depends on the amount of grain marketed by farmers and the amount and type

of grain product desired by consumers. The activity of the system in Illinois depends on Illinois production and consumption and on transportation rates from and to other producing and consuming areas. The location and activity of particular types of operations in Illinois depend on the above factors and on the relative costs of handling, storing, and processing grain in various locations and with various types of facilities. Government grain programs also have an important influence.

Grain transportation rates are currently undergoing frequent changes. Trucks and barges have greatly increased their share of traffic in recent years, and railroads are combatting this by gradually abandoning their traditional rate structure. New rates are generally more closely related to costs than the old rates, and discounts are being offered for large volume shipments. These developments may lead to decentralization in grain marketing, fewer terminal elevators, more country subterminals, and movement of processing plant locations from producing to consuming areas.

Current governmental proposals may reduce CCC stocks, the volume of grain marketed, and the proportion of marketings passing through commercial channels. These results may intensify competition in the merchandising, processing, and storing of grain, and some firms may find it difficult to remain in business.

Many other possibilities might be discussed, but evaluation of such factors is beyond the scope of this study. Detailed analysis of the reasons for past changes and likely future changes is the objective of the north-central regional grain marketing research project (NCM-30) now in progress.

## SUMMARY

Major Illinois grain-processing plants processed about 300 million bushels of grain in 1960. This was about 84 percent of their capacity. Substantial percentages of United States processed grain products were produced in these Illinois plants. Illinois terminal and subterminal elevators (including a few processors) merchandised about 332 million bushels of grain in 1960. The net processing and merchandising volume of about 526 million bushels was larger than the estimated 501 million bushels of grain marketed by Illinois farmers. The total 1960 storage capacity was 81 million bushels for processors and 102 million bushels for subterminal and terminal elevators.

Country elevators were the chief sources of grain received by processors and subterminal and terminal elevators, although most of the grain passed through carlot dealers. Grain merchandised went chiefly to processors, export, and terminal elevators. Processed products went

to many different types of agencies, most of them at distances of more than 100 miles from the processing plants.

Horizontally integrated firms were the minority in all the industries except river subterminal elevators. Many forms of vertical integration were present. Vertical integration was particularly important in the elevator industries. With the exception of grain moving from river subterminal to terminal elevators, however, the bulk of the grain and products were acquired and disposed of through outside firms rather than company-owned plants.

Compared with 1954, the 1960 processing volume was 10 percent larger, processing capacity was 13 percent larger, merchandising volume was 49 percent larger, and storage capacity was 41 percent larger. Changes resulted from additions to 1954 processing facilities and the construction of new subterminal and terminal elevators. Changing transportation rates, new government programs, and developments in other areas may cause drastic changes in the system in the future.





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